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Iris

FOR THE HOME GARDENER




H. M. BUTTERFIELD

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CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

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Iris

FOR THE HOME GARDENER

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**UNIVERSITY OF CALIFORNIA
DIVISION OF AGRICULTURAL SCIENCES**

California Agricultural Experiment Station — Extension Service



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SEPTEMBER, 1961

Many superior forms of irises are available to the home gardener in California. For the past 60 years, from the time of Jemima Branin of San Lorenzo before 1900, the best of the irises have been brought into California, and a great variety of striking hybrids have been developed. The transition of California iris gardens from the 1920's to the 1960's is almost unbelievable.

The author has had the opportunity to follow these developments, as a grower of irises in his own garden for more than 30 years; as a judge of seedling irises in test gardens for the American Iris Society; and as a personal observer of the work of such California iris breeders as William Mohr, Sydney B. Mitchell, Carl Salbach, E. O. Essig, and Stafford L. Jory. He has seen the development of control measures that have helped the gardener protect his irises against diseases and pests. He has observed the emergence of an increasingly stronger American Iris Society and its affiliates, to appraise new iris cultivars and to aid growers in many other ways.

This manual brings together information about selection and culture of irises for the benefit of the California home gardener.

Irises

FOR THE HOME GARDENER

H. M. BUTTERFIELD

*I*RISES ARE POPULAR garden flowers because they are hardy, long-lived, require little care, flower early in the year, and produce much color during their flowering season. While most irises bloom in April and May, some produce bloom in the summer and fall and a few in winter when other flowers are scarce. Their greatest appeal to the gardener and fancier probably lies in the ease of culture and their fine colors. Irises are being grown in all parts of California. Some native species grow naturally under favorable local conditions and thrive in the wild garden.

Selecting Your Irises

YOUR CHOICE OF IRISES IS WIDE
WHEREVER YOU LIVE IN CALIFORNIA

MANY EXCELLENT bearded and tall beardless irises have been developed in California gardens because conditions are unusually favorable for these introduced cultivars and species. In certain areas of California, having warm dry weather in the growing season, some of the most unusual irises can be grown, such as the *Oncocyclus*, *Regelias*, and hybrids. The

dry, warm summers in parts of the Mother Lode country and in parts of southern California allow some of these aril irises to survive; for this reason they are listed by a few California iris nurseries. It is safe to say that practically every home gardener in California can grow one or more kinds of irises and grow them well.

Color in Iris Flowers

COLOR IS A PRIMARY CONSIDERATION
IN THE SELECTION OF IRISES

THE COLORS in the various groups of irises differ greatly. This manual discusses the color range in the popular

bearded irises of gardens because colors in this group have been carefully studied and classified; do not overlook, however,

the interesting colors in other iris groups. The listings of species and cultivars on pages 22 to 33 call attention to important color considerations.

A wide variety of color combinations permits blends and contrasts. Consider such color combinations when you are planting so there will be no color conflicts and the colors will furnish the greatest appeal.

The color forms of bearded irises include blue, coral or pink and variants, red or near red, yellow, and purple. White is an absence of color; however, many white irises have a bluish or yellowish cast. Each of these color forms may be further classified. The blue may be light, medium, or dark. The pink may appear as rose-pink, coral, or flamingo pink, peach pink, pinkish buff, apricot pink, or orchid pink; there are also pink blends. The red sometimes is brown-red or crimson-red, or maroon-red. The yellow may be pale, bright, or deep; a greenish or chartreuse color is also found. Irises also come in other colors—tan, brown, copper, and bronze, some approaching red. The purples may be light, or dark, approaching black.

Color combinations are common. The bicolors have contrasting colors between standards and falls. The plicatas

normally have a light ground stippled, dotted, or edged with a darker color.

The bicolors have commonly been divided into variegatas, amoenas, and neglectas, with odd color combinations classed as novelties. Usually the variegatas have yellowish standards and red or purple falls. Amoenas have a white standard and purple falls. The neglectas have lavender or light violet standards and purplish falls. Occasionally a new iris may have a reverse of colors. For example, Wide World has white falls and blue standards.

The color of the beard varies greatly. Pinks with tangerine beards are popular. The beard may be white, yellow or golden, orange, orange-red, bluish and at times almost black, as in Black Taffeta. The color of the beard should combine well with the color of the falls and perhaps accentuate the color with some contrast.

Unchanging colors: According to the best evidence available, irises do not change color. What happens in many gardens is that in moving and replanting, a small rhizome is broken off and left unnoticed. It may take two or three years to reach blooming size, but suddenly another color is noticed when the rhizome does bloom.

Popular Iris Species

WHAT YOU NEED TO KNOW ABOUT CLASSIFICATION, GROWTH HABITS, AND CULTURE OF POPULAR IRISES

THE TWO MAIN classes of irises of interest to the gardener are bulbous irises and rhizomatous irises. The rhizomatous irises are further divided into three groups: the bearded, the beardless, and the crested and fringed irises. Their growth habits and recommended culture are discussed here.

BULBOUS IRISES

Bulbous irises include *I. reticulata* (netted iris), *I. tingitana* (Tangiers

iris), *I. xiphioides* (English iris), and *I. xiphium* (Spanish iris). The Dutch bulbous irises are usually hybrids, popular for beds and borders.

Growth habits: Bulbous irises increase by division of the mother bulbs. Over a period of 4 or 5 years the plants usually become so crowded that the bulbs have to be lifted and replanted.

Culture: Plant the bulbs 4 or 5 inches apart, and at least 3 inches deep, or about as deep as tulips or daffodils.

Select the larger bulbs for replanting. If you want to make use of the smaller bulblets, plant them where they can increase in size and reach blooming size.

Plant bulbous irises in full sun in a narrow bed or in rows. The heavier soil types are best. Keep the soil moist all through the growing season from December until April and May. The flowering season will probably be over by May; some varieties, like Wedgewood, flower very early.

RHIZOMATOUS IRISES

Bearded irises

The bearded irises are grouped according to the location of their beard, into the Oncocyclus, the Regelia, and the common bearded irises of the garden.

Oncocyclus irises

Oncocyclus irises have beards widely scattered on the haft. One representative of this group is *Iris susiana* (mourning iris).

Growth habits: The mourning iris and its many hybrids, as well as *Iris gatesi* (monarch iris) and *Iris lorteti* (Lebanon iris) flower from March to May. In general, these irises thrive on plenty of sun, a basic soil, good drainage, and dry summers. Some of their hybrids may be treated much like the common bearded irises. Usually Oncocyclus need a generous supply of moisture during the normal growing season, but dry summer weather is important after flowering is over. The rootstocks are somewhat more slender than on the common bearded irises; therefore, do not move them until fall when moist soil is expected.

Culture: see Regelias.

Regelia irises

Regelia irises are bearded on both falls and standards. This group is represented by *Iris hoogiana* (redbeard iris) and *I. korolkowi* (redvein iris).

They are sometimes crossed with Oncocyclus irises, and these crosses are often listed under Oncoregelias. Both Oncocyclus and Regelias have arils on the seeds and are known as aril irises.

Growth habits: The Regelias come from Turkestan and the western slopes of the Himalayas where summers are dry and warm. They are a challenge to gardeners in most parts of California except in the lower part of southern California and parts of the Mother Lode country where warm, dry summers prevail. As a rule they cannot tolerate the moist soil conditions in summer provided for many of the common bearded garden irises. They are not as exacting as the Oncocyclus, but are often classed with them for garden culture. Do not try to grow Regelia irises where summer rains are expected. They should have good soil drainage. Some hybrids are easier to grow than the species.

Culture of Oncocyclus, Regelia, and hybrids: This group of aril irises must have warm, dry summers to survive. If rains come, it may be necessary to dig out the irises about June and to store them until planting time the following October. Growth must be continuous from October until the following June. The Regelias are less exacting but will respond to about the same culture as the Oncocyclus group. A few of the hybrids are almost as easy to grow as the common bearded irises. But few growers live where summers are dry and warm enough for the aril irises.

Common bearded or German

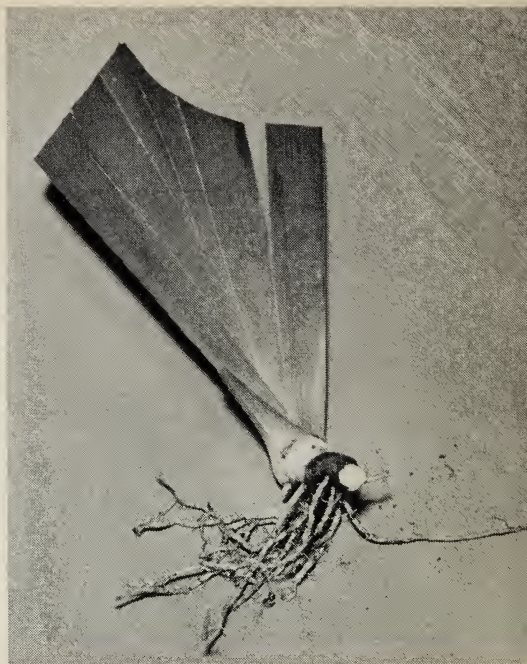
The common bearded, or German, irises have beards only on their falls. They constitute the great majority of the bearded garden (eupogon) irises. To this group belong *Iris flavescens*, known only in gardens, *I. germanica* (German iris), *I. mesopotamica* (mardin iris), *I. pallida* (sweet iris), *I. pumila* (dwarf iris), and *I. variegata* (Hungarian iris).

Growth habits: Most of the common bearded irises of gardens have thick, fleshy rootstocks able to stand summer drouth and some drying at digging time. They flower from late March through April and early May. A few may flower in late summer into fall. Most of the cultivars popular today are hybrids derived mostly from the German, the sweet, and the mardin irises. Early German irises lacked height of flower stem and size of flowers; extra vigor, large flower size, and taller stems were introduced through crosses with the mardin iris and other tall-growing irises. The crossing with the mardin iris also has brought a decrease in cold tolerance in many cases. Such differences in cultural conditions need to be considered when you select common bearded irises for your local climate. New growth starts when flowering is over and the offsets are usually well developed by late summer and fall. Growth usually slows down in summer when weather is hot. The rhizomes continue their length growth, and side branching is normal. In time a circular clump will be formed and the oldest part of the rhizome may die back.

Their growth habits make it advisable to divide each clump every few years and to transplant in late summer or fall after the hottest weather is over. Good soil drainage is needed to prevent some of the rots. Dry weather usually helps decrease leaf spots which attack some of these irises.

Culture of the common bearded iris is given here in detail as this group contains some of the most popular garden irises.

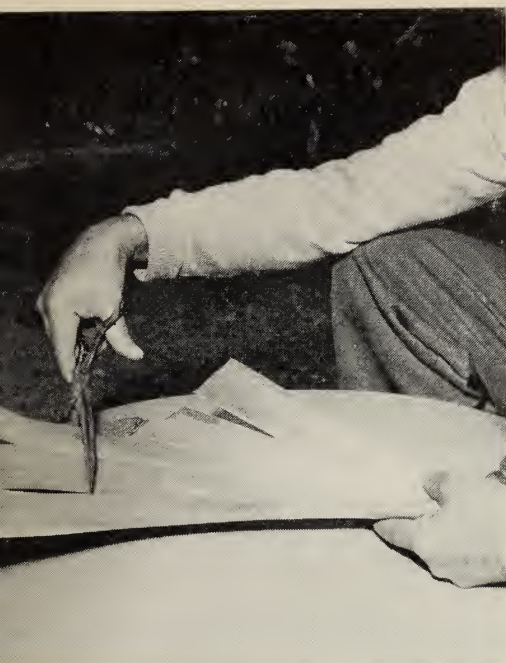
Planting of the iris rhizome should be done as soon as possible to prevent the roots from drying. Cut back the leaf tips to fanshape (see photos on this and next page) to reduce evaporation. Since the outer leaf tips will continue to die back after digging, this cutting back to fanshape helps the rhizome to become established in the new location. The roots



The leaves of a bearded iris cut to fanshape ready for planting. Note that roots arise from the underside of the rhizome.

are on the underside of the rhizome and should be spread out so they will be able to rest in moist soil. The oldest roots will soon decline, but the new roots will push out and anchor the rhizome in the soil. The rhizome should sit in the shallow surface soil as a duck in water with the top of the rhizome at the surface (see photos on page 7, showing the proper depth). Do not cover the growing tip with soil; this may encourage rot and delay blooming. Firm the soil about the roots so each active root will come into contact with moist soil. If the soil is not moist to start with you must water to insure plenty of moisture. Do not plant in soggy soil or where the soil will be poorly drained at any time of the year. If necessary, plant on raised beds or ridges. In case the rhizome has few roots it may be held upright with the support of a small stake.

Bearded irises may be safely planted from the end of the flowering season up



Cutting back the leaves on an iris rhizome getting ready for planting. A sharp pair of scissors is suitable for this task.



An iris rhizome planted with all of the roots covered but upper surface of the rhizome uncovered.

through September. Where summers are very hot, delay planting until cooler weather arrives in late summer. Summer planting is preferred if the weather permits

Try to plant in a sunny location where plenty of light will reach the rhizomes. Too much shade may prevent flowers from forming. Sunshine for at least half the day is recommended. Only a few species of irises will flower in the shade.

Dividing the old clumps becomes necessary every 3 or 4 years when the rhizomes in the circular clump (see photo on page 8) become crowded.

Dig the entire clump. This gives you a chance to dig the soil and put it in good condition for replanting. With a knife, cut away some of the oldest rhizome portions lacking in vigor and discard them unless the variety is scarce. Plant the older pieces, if you use them, by themselves and allow them to send

out new growth and form vigorous rhizomes. Each new fan wanted for planting should have a rhizome about 3 to 5 inches long.

Where the soil is still in good physical condition and there is no need to replant in a better location, thin out the old clump without disturbing the large healthy growing fans. Cut off the back part of each large rhizome to leave about 3 to 5 inches of the growing tip. In this way, flowering will probably not be disturbed.

Soil preparation is done in connection with the dividing of the iris clumps every 3 to 5 years. Digging and pulverizing the compacted soil will put the old soil into better physical condition. Soil conditioners such as manure, sand, peat moss, and perlite or other light mineral conditioners may be mixed in with the pulverized soil to keep it from becoming quickly compacted. Most bearded



Offsets of an iris rhizome form a wide circle about the mother rhizome. Division should be made before offsets become crowded.

irises grow very well in the heavier soil types as long as the drainage is good. The addition of lime is not required in most California soils. Do not add lime or wood ashes unless the soil is decidedly acid.

Spacing of the rhizomes should be not less than 8 to 12 inches apart. Set three rhizomes of a variety in a group, or set single plants in a row and label them. If you have enough room and you do not wish to replant for several years, you may set the rhizomes as much as 15 inches apart. Irises need room to grow and should not have to compete with the roots of trees or shrubs. Plant in borders or beds or corners where the flower stalks will not be damaged by pedestrians. An all-iris garden is usually planted in rows or in narrow beds.

Tillage is not essential as long as weeds are controlled and the soil does not become too compacted. Shallow tillage in the open soil between rhizomes

will help the water and the fertilizer to penetrate the soil. Avoid deep tillage around the plants because iris roots are shallow. Do not throw soil on the rhizomes if you use a cultivator to control weeds or to loosen the soil.

Fertilizing is ordinarily not needed where the iris clumps are lifted every 3 or 4 years and the soil is reconditioned. Where the soil is depleted in nitrogen or other important plant nutrients, add a moderate amount of nitrogen fertilizer. Some growers add a liberal amount of manure early each year. A manure mulch applied about the time the rains start in winter helps maintain soil fertility. Too much fertilization, either manure or commercial fertilizer, tends to produce soft growth and increase bacterial soft rot. A teaspoon of ammonium sulfate to the square foot is probably enough for one application in the early growing season. If you use a weaker nitrogen fertilizer, say 6 per cent nitrogen, use it at the rate of about 3 teaspoons per square foot. Ammonium sulfate contains at least 20 per cent nitrogen. Regulate the amount according to the nitrogen content of the fertilizer. Avoid excessive use. Apply just before irrigation.

Grooming of the iris garden includes removing old or diseased iris leaves. Once a leaf starts to die back because of old age, you can safely remove it.

The common practice of cutting back green iris leaves rather heavily in summer is questionable. Cutting back healthy green leaves as much as half their length will help get rid of brown tips on the leaves and will keep the garden looking neat, but will weaken the plant. Only where leaves will continue to die back is such heavy cutting justified. Removing the worst of the outer old leaves is all that is really needed.

To tidy the garden, remove old flower stalks left after the flowering season is over. Cut the stalks off next to the rhizome or yank them back at a right angle so that each stalk snaps off snugly against the old rhizome.

Mulching for winter protection is not required under most California conditions because the winters are not cold enough to require a mulch for cold protection. Mulching is needed only where winter temperatures are very low.

Beardless irises

This group of irises, also called apogon (without a beard), has been divided into several subsections with different characteristics. The principal subsections are discussed here.

Japanese irises

Japanese irises. *Iris kaempferi* (Japanese iris) and the related *I. laevigata* (rabbit ear iris) and *I. pseudacorus* (yellow-flag iris) belong to the subsection *Laevigatae*.

Growth habits: Japanese irises thrive only with considerable summer moisture and where the sun is not too hot in summer. They flower in May or later, usually a month after the German group of bearded irises. The rootstocks are more slender than on German irises, and will not stand much drying. Plants flower well near the ocean and further inland where cool summers prevail. They thrive in a fertile soil that is slightly acid, although they have been grown well in soils that contain some lime and are slightly basic. They need a generous supply of soil moisture and high soil fertility. Under such conditions, Japanese irises will bring forth large flowers and tall stems. The cultivars vary in height of flower stem and flower size. There are both single- and double-flowered cultivars, but only those with several petals are popular. Hot weather will cause a rapid deterioration of the flowers, and some colors fade badly in a hot sun. Japanese irises are difficult to grow well in the drier and hotter parts of California but flourish in parts of Oregon and Washington.

Culture: Plant Japanese irises in the cool coastal districts, especially from

central California northward. Sometimes you can prepare a bog garden that will furnish both high soil fertility and an abundance of moisture. When transplanting these irises late in the year, do not allow the rhizomes to dry out.

Native irises

Native irises, such as *Iris douglasiana* (mountain iris), *I. innominata*, *I. macrospira* (ground or tube iris), and closely related species belong to the sub-species *Californicae*.

Growth habits: In general, native irises grow where the soil remains moist throughout the year, yet they remain dormant during the dry summer and fall months. The creeping rootstocks are slender, yet the plants form clumps. Because the rhizomes are small, they will not stand much drying. Planting on slopes will help provide good drainage which these native irises require. The flowers are borne on slender stems.

Culture: Plant native species at about the time when the rains begin. If you transplant them to the garden along about September or October until as late as February, they should soon become well established. Plant them in a location that is not too hot or dry and that provides good drainage. Water carefully through the dry months as long as the leaves are green. Once the plants become established they require little special attention except watering during the dry months.

Siberian irises

Siberian irises belong to the sub-species *Sibiricae*.

Growth habits: They form clumps and have slender short rhizomes. The flower stems vary in height but may reach 2 to 4 feet in the different cultivars offered. Flower size is much like that of native California species, but the flower stems are much longer. Fall planting is the general rule. An abundance of soil moisture and fertile soils are needed. They are not quite as exacting as the

Japanese irises. The foliage usually dies down in winter and new growth starts in early March. The plants are rarely troubled with disease or pests.

Culture: Plant Siberian irises in a fertile, moist, well-drained soil. Where water is limited, the plants may be set near a water hydrant so you easily can keep the roots well watered throughout the dry months. When the clumps become badly crowded, divide them late in the year.

Tall beardless irises

Tall beardless irises include such species as *Iris spuria* (seashore iris), *I. graminea* (grass iris), *I. crocea* or *I. aurea*, *I. monnieri* (Monnier iris), and

I. ochroleuca (yellowband iris). They belong to the subspecies *Spuriae*.

Growth habits: In general, the tall bearded irises have flower stems that reach a height of 3 to 4 feet under favorable growing conditions. The flowers are shaped more like the Siberian and some bulbous irises than the common bearded irises of gardens. The seashore iris has relatively small flowers of blue-purple. The falls are only about 2 inches long, but crosses with the Monnier iris greatly improved the size of flower and also the color range. Yellowband iris is similar in height and growth habit to the Monnier iris, but has a different color. Their similar growth habits have justified the lumping of all the tall

Iris douglasiana (mountain iris) is a native iris that belongs to the sub-species *Californicae*.





Flowers of a Siberian iris, New Blue.

beardless irises into one group, but selection and crossing have furnished us with a wide color range in cultivars. The rhizomes are sufficiently large to tolerate considerable drouth and some warm weather. When they become established in good soil, the tall beardless irises are as vigorous as the German bearded irises. The tops die back each winter and come up again about March.

Culture: Plant tall beardless irises in the full sun in fertile, well-drained soil. Divide them in the fall or early winter months. Continue watering the plants until the tops die down naturally. Their rhizomes, much like those of the common bearded irises, will tolerate more drouth than many of the other beardless irises. As the clumps become badly crowded, the flower stems become shorter and the flowers smaller, so divide every few years to maintain better growing conditions.

Winter-flowering

Winter-flowering irises, such as *Iris unguicularis* (Algerian or winter-flowering iris), belong to the subspecies of *Unguicularis*.

Growth habits: Winter-flowering irises grow much like our native species but usually form a much denser clump. Once established in fertile soil, they will thrive for several years without special attention. Plants flower well in either full sun or partial shade.

Culture: Divide late in the summer or early fall, so plants become established during the winter months. Split the old clumps apart and set out the smaller divisions. When clumps become crowded divide and replant again. Control of slugs and snails is essential to keep the flower buds free from damage.

Miscellaneous beardless

Miscellaneous beardless irises found in nursery catalogs include the Louisiana irises, such as *Iris fulva* (copper iris) and *Iris foetidissima* (Gladwin iris).

The Louisiana irises thrive with summer rains or regular summer irrigation. They will stand full sun if the sun is not too hot. They require about the same conditions as the Siberians. The rhizomes spread fast; when they get too long, replant. If your locality has hot summers, plant in an eastern exposure to provide partial shade.

Gladwin Iris is a shade-tolerant iris and needs a liberal amount of soil moisture. The flowers are not much appreciated, so plant where the seed pods can ripen well during late summer. The seed stalks are gathered after they mature and used in flower arrangements. The plants form vigorous clumps and need little special attention other than to provide moisture during the dry season. Keep snails under control.

Crested and fringed irises

These species are rarely planted in California gardens. They have slender rhizomes, and the outer perianth segments or falls are fringed with a petal-like crest on the claw and lower part of the blade. They are sometimes referred



Tall bearded iris, one of the hybrids, Fifth Symphony.

to as the Evansia group. Included are *Iris cristata* (crested iris), *I. japonica* (fringed iris), and *I. tectorum* (roof iris).

Growth habits: The butterfly or fringed iris and the roof iris have very slender creeping rootstocks so will not stand much drying. These irises tend to creep along on the ground and are hard

to confine in one place. They are grown in home gardens only occasionally, yet the fringed iris will flower in considerable shade and may be appreciated for that reason.

Culture: Move crested and fringed irises in the fall at about the time rains begin so they will have plenty of soil moisture.

Pest Control

ONLY A FEW IRIS PESTS IN CALIFORNIA REQUIRE PROMPT CONTROL

SLUGS AND SNAILS

SLUGS AND SNAILS, unless controlled, can soon riddle the iris leaves in the spring. Poison baits containing metaldehyde are effective; scatter pelleted bait around iris clumps. Have the bait rest on the ground and not on the foliage. Put out new bait when the old is no longer effective or attractive. A powder form of metaldehyde is now being dusted on some greenhouse plants to protect against the small greenhouse slugs and should be equally effective against slugs attacking the leaves or buds of irises in the garden. Always start treatment before slugs or snails have had time to greatly increase and cause serious damage.

APHIDS

Aphids or plant lice may attack the tender leaves or buds of the iris but are easily controlled by such materials as malathion or lindane sprays or dusts. Spray as soon as the aphids appear on either buds or leaves in appreciable numbers. In many years not enough aphids will be present to justify spraying. If the spray material is very caustic it will burn the tender buds and leaves, so follow directions on the container carefully. A few aphids on a leaf or bud can be removed with thumb and forefinger by stripping them off.

ROOT APHIDS

The iris root aphid is covered with a white mealy wax and may feed on rhizomes. Treatment rarely is required. Malathion or lindane sprays are effective when used according to directions of the manufacturer.

NEMATODES

Nematodes could infest iris roots but ordinarily do not cause much damage.

The commercial treatments for rootknot nematode control between crops will reduce, but in most cases not eradicate, the nematodes. Treatment of the bare ground after lifting the iris may give the irises planted a better chance to develop good vigor. Watering and a little fertilizer can also stimulate good growth and thus minimize the stunting effect of the few remaining nematodes. Replant in a nematode-free area if possible; be sure the planting stock set out is free from nematodes. Gall-like knots on the roots indicate their presence.

WHITE FLY

The iris white fly sometimes infests iris leaves. You can see the adults fly when the infested leaves are disturbed. These adults have two dusky spots on each forewing and a spot on each of the rear wings. The white flies lay their eggs on the leaves; the eggs hatch out into a small scale-like intermediate stage that remains stationary on the leaves, usually in a small colony. The iris white fly is most abundant in the garden during late summer and fall. Malathion will control the adult and other stages. Damage is rarely very serious.

OTHER PESTS

Other pests are reported in other states and occasionally in California. So far the iris borer has not been found in the state. Certain kinds of thrips may infest the iris, but are not a serious pest in California. Neither is the verbena bud moth, which has been reported in iris literature.

Rodents such as the pocket gophers and moles can become nuisances, especially near vacant property; but poisoning and trapping can effectively control such pests in the ordinary home garden.

Iris Diseases

TAKING CARE OF YOUR GARDEN, USING HEALTHY
AND RESISTANT STOCK, AND APPLICATION OF
CHEMICALS WILL KEEP YOUR IRISES HEALTHY

FUNGUS LEAF SPOT

THE FUNGUS LEAF SPOT (see photo, below) is a disease on both rhizomatous and bulbous irises. First, small, light brown spots with water-soaked margins appear on the leaves. These spots, which are most numerous towards the leaf tip, gradually enlarge to oval or elliptical areas that may be white, gray, or tan at the center with reddish-brown borders. The tissues around the spots may turn yellow and, under moist conditions, the centers of the spots may be covered with a greenish-black layer of spores of the causal fungus. The spots may be so numerous that leaf tips are killed. Under moist conditions, the disease spreads rapidly after flowering, and the foliage dies prematurely. Years of continuous infections may cause plants to become too weak to flower and eventually may kill the plants. Though many of the garden hybrids and iris species are susceptible, some hybrids and species are resistant.

Iris fungus leaf spot on leaves of a bearded iris.



Control

Remove and destroy all infected leaves. Divide the clumps to give them more space and avoid overhead watering after the disease appears. Zineb or ferbam sprays applied with a spreader-sticker will also help. Use resistant varieties and species wherever the disease is severe.

BACTERIAL SOFT ROT

This serious disease of rhizomatous iris first appears as a dying of the leaf tips and a stunting of the plant. This is followed by water-soaked areas at the bases of the leaves. A soft rot then develops in these areas and spreads upward and downward, extending into the rhizome, causing the interior tissues to collapse into a foul-smelling mass surrounded by the intact skin. During this stage, the leaves wilt and finally the entire fan collapses.

Although the soft rot bacteria occur naturally in most soils, they invade plants almost entirely through wounds. In iris, these wounds are commonly made by insects, such as borers, and by cultivation equipment. Once the plants are infected, the disease is favored by deep planting, wet soils and poor air circulation.

Control

Prevent the disease by a good insect control program and by avoiding mechanical injuries. Plant the rhizomes high (at least $\frac{1}{2}$ the rhizome above soil level), and on ridges; avoid wet soils, areas of poor air circulation and shade. Destroy infected plants. However, if you spot the infection soon enough, lift the rhizomes, scrape out all of the rotted area, and thoroughly dry the rhizome

before replanting. Dusting the cut surfaces with one of the seed-treatment materials such as Arasan or Ceresan also will help control the disease. Remove the old parts of the rhizome clumps since these are frequently more susceptible to injury.

BLUE MOLD

Blue mold is the common and occasionally very serious disease of the bulbous iris. It develops mainly in storage but also can affect plants in the soil. The disease appears as a sunken brown lesion on the bulb, and may spread through the bulb rotting it completely. On parts of the infected bulb, the fungus may produce masses of blue-green spores. In the field, infected bulbs may fail to emerge or form weak, stunted shoots that become yellow and die. The base of the stem and leaves have a soft mushy rot with a disagreeable odor. The fungus enters through wounds; and the disease is worse on bulbs attacked by wireworms or nematodes, or those bruised during digging. Storage of bulbs in poorly ventilated, damp places will favor disease development.

Control

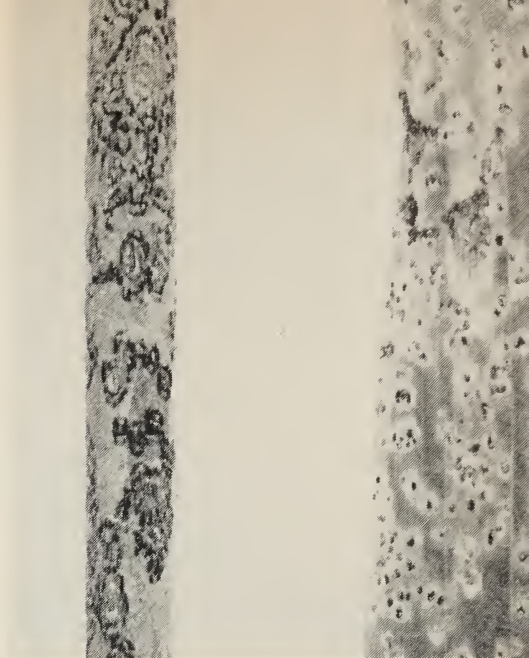
Handle bulbs with care to prevent injury, and cure properly. Store bulbs loosely packed in well ventilated, dry places. Plant in light, well drained soils, free of nematodes and wireworms.

CROWN ROT

This disease appears as a rotting of the bases of the leaves and flower stalks, causing the leaves to die from the tips, wilt, and topple over. Small, tan or brownish, seedlike structures of the fungus are found embedded in a slight cottony growth at the low portion of the stem, rhizome, or bulb in contact with the soil. A mass of dirt usually clings to infected portions.

Control

Control is difficult, partly because the



Iris rust. Infected flower stem and leaf showing pustules containing rust-colored spores.

causal fungus attacks many different plants including vegetables, ornamentals and weeds. Remove and destroy diseased plants. Remove soil from at least 6 inches around diseased plants. Soil treatment with pentachloronitrobenzene (Terraclor) at the manufacturer's recommendations will also give control.

IRIS SCORCH

The cause of this disease of rhizomatous irises is unknown. The central leaves begin drying at the tips until all the leaves of the clump are dead. The center portion of the roots are completely rotted, leaving only the outer tissues.

Control

No control is known. Sometimes removing roots from diseased plants, drying the rhizomes, and replanting in a different location helps them to recover.

IRIS RUST

This fungus disease affects bulbous and rhizomatous iris. It appears as small, elongated or oval rings composed of small raised brown pustules on the

leaves or flower stalks. These rupture and release the brown or red spores giving the area a rusty appearance. Infected areas are sometimes surrounded by zones of yellow tissues. Usually the disease does not cause trouble, but occasionally leaves and flower stalks may be killed.

Control

No control measures have been developed. Many varieties are resistant, so avoid susceptible varieties. Remove and destroy all diseased plant material. Rusts on other plants are controlled by zineb sprays. If you try this material on irises, be sure to include a spreader-sticker because of the waxy nature of the leaf surfaces.

IRIS MOSAIC

This virus disease is common on bulbous and rhizomatous irises, though the

symptoms rarely appear in the hybrid varieties of the latter. Other species such as some forms of *Oncocyclus* irises may be severely affected. In the bulbous irises, the symptoms appear as yellow streaks in the foliage and bud sheaths. In some varieties there is a color break in the flower tissues of infected plants. Diseased plants may be slightly to severely stunted, and some may fail to bloom. The symptoms are most prominent in cool weather and may be masked in warm weather.

Control

Control is difficult. Since the virus is spread by aphids, a good insect control program is of benefit. Also, rogue all infected plants. Plant virus-free bulbs where possible. However, in certain groups, such as the Dutch irises, some varieties are 100 per cent virus infected, and it appears to be impossible to find any virus-free planting material.

Growing Irises From Seed

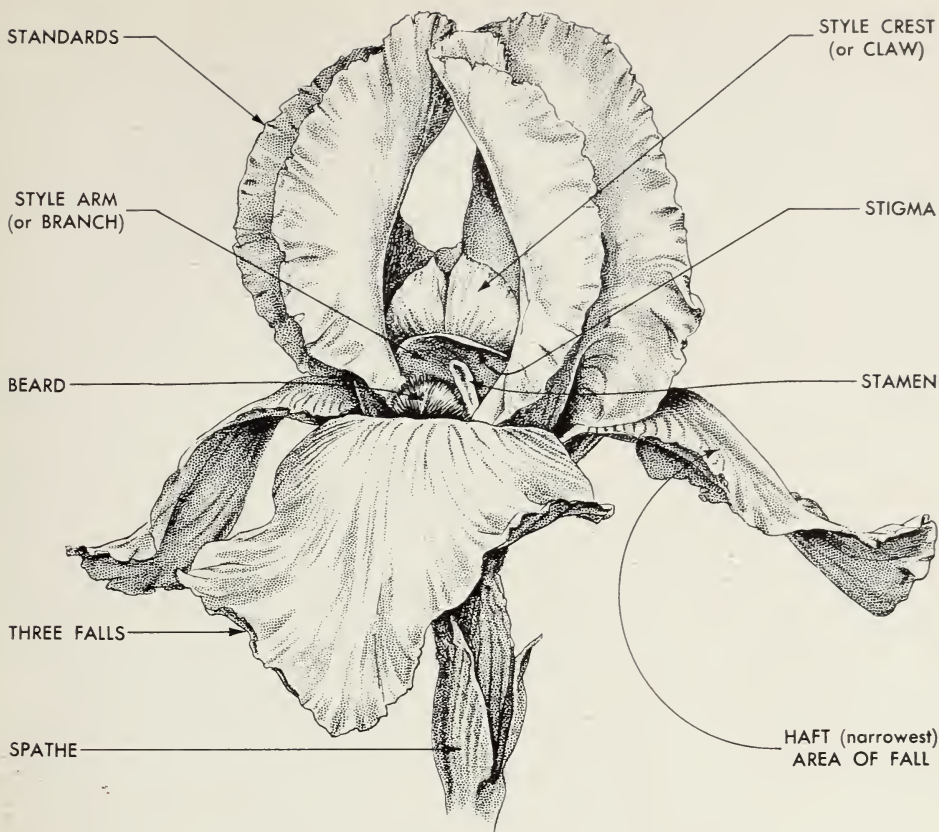
SOME TIPS TO IRIS FANCIERS WHO WANT TO DEVELOP SUPERIOR SEEDLINGS FROM SEED

SEED CAN RESULT from either selfing or crossing. Many of the bearded irises fail to mature seed unless hand pollinated. Some iris cultivars develop good pollen while others are poor pollen producers. If seed is to form, viable pollen must be introduced to the stigma; and it must be introduced while the pistil is still receptive to pollen.

HAND-POLLINATION

An anther on a bearded iris flower lies beneath each style arm (see drawing, page 17). Iris flowers normally have three style arms with a stamen beneath each of them. On the underside of the tip of the style arm is a sticky band—

the stigma of the flower. Introduce pollen to this band where, under favorable conditions, the pollen grain will sprout and send a tube down through the style to reach the ovule. The stigma becomes exposed when ready for pollination. The sex cells in the pollen tubes unite with the sex cells in the ovules to start seed development. If the pollination is faulty or not complete, the flower stalk may form a seed pod with few or no seeds. But under favorable conditions, each seed pod that forms should mature many seeds. Label each seed pod that develops from hand pollination, to show date, pollen parent, and seed parent. Keep this label attached to each seed pod gathered. Bag all hand-pollinated flowers before



Parts of a bearded iris flower

and after pollination to prevent pollination from another source. You may break the standards away to make pollination easier. Gather the seed pod before it has had time to split and scatter the seeds. By covering each seed pod with a small porous bag, the seed can be easily saved.

Planting the seed

Iris seeds need little after-ripening. Plant fresh seed soon after maturity in a covered frame or bed (see photo, page 20), so that moisture and temperature can be regulated. If the seed is not too dry or weak, seedlings should appear the first year. Old iris seed may germinate over two or three years. Plant the small seedlings in rows and cover the surface with coarse sand so it dries off

quickly after watering. Poor drainage can rot the seed. The mixture used for seed germination may contain one-third granulated peat moss, one-third sand, and one-third loam soil. Plant the seeds not deeper than $\frac{1}{8}$ to $\frac{1}{4}$ inch or just deep enough so the surrounding soil will not dry out during the period of germination. It may take only a few weeks until the first small fan-like seedlings begin to appear, but germination is often delayed for two to three months or longer, depending on temperature, moisture conditions, and the age of the seed when planted.

Embryo culture

Prompt germination of iris seed can be obtained by embryo culture. Some iris crosses do not produce seed that is



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TALL BEARDED IRISES

1. The plicata irises, such as *Blue Freckles*, meet the approval of iris fanciers. The standards are well domed. (See page 26.)

2. The irises with bronze colors, such as *Bronze Bell*, are among the most popular. (See page 26.)

3. The bicolor irises have a distinct color combination. A wide choice in harmonious colors is available. *Spanish Fandango* cultivar shown. (See page 28.)

4. Irises with flamingo pink in the standards or falls have increased the color range in recent years. *Happy Birthday* shown with standard not well domed. (See page 27.)

5. Bearded irises with ruffled or lacy petal margins have added interest. *Butterscotch Kiss* is pictured in which the falls stand out well. (See page 27.)

6. The golden yellow irises with orange beard are very popular. *Sunset Gold* is the cultivar shown. (See page 28.)





Bearded iris seedlings in a seed bed six months after seed was planted. Different crosses are separated by small wooden strips.

easy to germinate; removing the embryo and culturing it on nutrient agar will bring about germination of seed that could not be germinated in any other way. Iris breeders may resort to this method where germination of viable embryos is difficult or impossible. Even immature embryos of only six to eight weeks have been successfully germinated by this method when the seed planted normally did not germinate because there was not enough endosperm to nourish the embryo to full maturity. Details for embryo-culture techniques will be found in such publications as Randolph, 1959 (see page 34).

Lining out seedlings

When the seedlings are up a few inches, line them out in rows to give them a better chance to grow undis-

turbed. The frame is needed only in the early germination period. Label each group of seedlings with the same parentage to show the nature of the cross. Seedlings with the same parentage may vary greatly in important characteristics, such as color and form of flowers, branching of stems (see photo, page 21), height of stems, and vigor. Identify seedlings with the same parents with a decimal number attached to the original number for the cross. When the seedlings begin to flower, sort them over and keep only those that are promising. The tags should always show the parentage of each seedling.

Naming

Never give seedlings a final name until they have proved to be worthy and distinct. Their number will identify them

sufficiently until they are worth naming. To avoid confusion, check with the American Iris Society and its affiliates as to which names are already in use and which are eligible. Test gardens for worthy seedlings and iris shows where seedlings are exhibited and rated will also help you determine the merits of a seedling. Any seedling that is not to be introduced should remain unnamed. Experienced iris growers will usually be able to appraise a seedling and can indicate whether it is worth naming.

Breeding principles

A discussion about the genetics of iris breeding is beyond the scope of this manual, but the principles of inheritance must be understood if planned iris breeding is to be successful. It may take time to learn which characters are inherited from parent plants and which ones are recessive. Line breeding will help you learn about the genetic makeup of parent plants. But not until you know the characters of prospective parent plants will you be able to plan desirable crosses and predict the outcome.

A wide branching habit is preferred for bearded irises.

You can find the fundamentals of iris genetics in recent publications (Randolph, 1959). Much of modern progress in iris breeding has resulted from the introduction of irises with more chromosomes. It is believed that *Iris mesopotamica* with its 48 chromosomes helped in the development of taller flower stems and greater vigor. Many of the older German bearded irises, such as Calypso, Caprice, Eldorado, Flavescens, Imperator, Loreley, Mme. Chereau, and Parisiana, were diploids with a chromosome count of only 24. With them alone, the modern tall bearded irises could not have been developed. Most of the triploids with a count of 36, as San Gabriel, Ballerine, and Frieda Mohr, are being replaced with the popular tetraploids, many with a chromosome count of 48.

Do not include too much in your breeding program; color, form, stem and branching, vigor, substance and, in some cases, size, are important considerations. To get superior seedlings, confine your efforts to just a few characters. Crosses of unlike parents have possibilities and limitations. William Mohr boldly made crosses to produce the William Mohr, and this line of breeding has introduced the very unusual group of irises listed in the table on page 25. But chromosome count is not the only factor. Linkage of genes and other considerations also affect results. Without a good understanding of genetics, you will most likely be successful when you use certain superior parents of modern breeding and work with enough seedlings to stand some chance of getting desirable offspring.



*Iris, the flower of many colors,
received its name from the
Greek Goddess of the rainbow.*

Iris Species Planted in California

Iris albicans (Yemen iris) closely resembles a white *Iris germanica*. It flowers early.

Iris amoena, or *I. hybrida*, resembles *I. neglecta* but has longer spathe valves and is white or faintly tinted lilac on the outer segments and style branches. Known only in cultivation.

Iris crocea, or *I. aurea*, is one of the tall beardless (apogon) irises valued for its golden flowers.

Iris douglasiana (mountain iris) is native to California. The flowers range from lilac purple to cream and white. Those with much pink are considered choice. It grows naturally in the coast range, from Monterey County north to Oregon.

Iris flavescens is a garden hybrid of long-standing with lemon-yellow flowers and deep yellow beard. Known only in cultivation.

Iris foetidissima (Gladwin iris) has narrow green leaves and is valued mostly for the seed pods which mature scarlet globular seeds late in the growing season.

Iris fulva (copper iris) is of the swamp irises from the southern states used in hybridizing; has six petals of terra cotta color.

Iris gatesi (monarch iris) comes from Asia Minor. Standards are 4-5 inches across, greenish or grayish with purplish veins and dots.

Iris germanica (German iris) helped breeders produce most of the modern bearded irises. Because stems are often short, modern bearded irises are the result of crosses with other species, such as *I. mesopotamica* and *I. pallida*.

Iris hartwegi (foothill iris or Sierra iris) is a native to the Sierra Nevada from Plumas to Kern County and south to southern California.

Iris hoogiana (redbeard iris) comes from Turkestan, and is one of the aril irises of interest because of the odd coloring briefly listed on page 25. It must have warm, dry summers to survive.

Iris innominata comes from Oregon and somewhat resembles *I. douglasiana* but runs to interesting yellows which are prized by fanciers of wild irises.

Iris japonica (butterfly iris) is an oriental crested species that flowers fairly well in shaded locations. The delicate lacy, pale blue small flowers are admired. Not suitable for the open garden.

Iris korolkowi (redvein iris) comes from Turkestan, belongs to the aril iris group. The falls are olive green with brown veins. Survives only when summers are dry and warm. Only the falls are bearded.

Iris kochi (Koch iris) is a form of *Iris germanica* or a hybrid with that species known for dark purple flowers and its tendency to flower in the fall months. No longer grown in California but probably used in some of the first crosses to develop cultivars that flower in summer or fall.

Iris laevigata (rabbit ear iris), an oriental diploid species related to the Japanese iris but leaves without a distinct midrib. Standards are as long as the falls.

Iris longipetala (coast iris) native to California's coastal region from San Francisco Bay to Monterey County. Standards usually are light violet and falls white veined with violet. Does best in heavy moist soil and not too much hot sun.

Iris macrosiphon (ground or tube iris) is native to California's coast ranges from Santa Clara County north

to Del Norte and inland to Butte County. Colors run to violet purple or straw-yellow. Forms with cream color are common.

Iris mesopotamica (mardin iris) probably is a native of Armenia, and is used to cross with German bearded irises to increase size of flowers and length of stem. Practically all the very tall bearded irises of today contain this species in their ancestry.

Iris missouriensis (Rocky Mountain iris or western blue flag) is native to California's north coast range in Mendocino and Solano counties, south to the San Bernardino Mountains, east to Inyo County, and north to Modoc County.

Iris monnieri (Monnier iris) is one of the tall beardless irises with lemon yellow color, similar to *I. crocea* (*I. aurea*) and *I. ochroleuca*. Has been crossed with *I. spuria* to produce such varieties as Monspur.

Iris neglecta is a hybrid (*Sanibucina* × *variegata*)

Iris ochroleuca (yellowband iris) is a common tall white beardless iris, sometimes wrongly called Spanish iris. The standards are white, the falls white with a varying amount of yellow in the center.

Iris pallida (sweet iris) comes from Europe and is one of the parents of the taller bearded irises. It has short, papery white spathe-valves with flower stems up to 36 inches. The flowers are violet to white with yellow beards. Variety *dalmatica* has lavender-blue flowers with falls more spreading than drooping; possibly a hybrid, with *I. pallida* as one of the parents.

Iris plicata has stems and leaves similar to *I. pallida*. Flowers are white at the center, faintly veined and flushed with lilac toward the margin. Probably derived from *I. pallida*. No longer grown in California but still referred to in some catalogs.

Iris pseudacorus (yellowflag iris or water iris) has flower stalks up to 5 to 6 feet, but the canary-yellow flowers are not equal to those of *I. aurea*.

Iris reticulata (netted iris) is a bulbous species from the Caucasus, often planted in pots and resembling a small blue Spanish iris.

Iris sibirica (Siberian iris) is a hardy species from the Orient that does best with a generous supply of water and fertile soil. The flowers are beardless on stems up to 2 to 4 feet and range from white to lavender, and deep purple.

Iris spuria (seashore iris) somewhat resembles the Siberian iris with a purple flower. Has been crossed with other tall beardless irises, as *I. monnieri*, to increase the range of color.

Iris squalens has much-branched stems 2 to 3 feet high with spathe valves partly dry. The flowers are lilac-purple and the beard is yellow; inner segments are lilac and yellow or brownish and yellow. Many of the old German irises belonged to this form. The combination of colors may still be seen in some modern varieties or hybrids.

Iris stolonifera (runner iris) is a species from Turkestan with light or dark brown-purple, marked in the middle of the frilled segments with blue. Falls reflexed and haft yellow-bearded. Has been crossed with both *I. korolkowi* and with *I. hoogiana*. Some of the hybrids are interesting but the species is not easily grown.

Iris susiana (mourning iris) comes from Asia-Minor, has very large standards and one flower to a stem. The odd grayish ground color with blackish veins makes this species useful in breeding work. Most of the Mohr hybrids (see page 25) have *I. susiana* for one parent, at least in the original crosses. Must have warm, dry summers to survive.

Iris tingitana (Tangiers iris) is a bulbous iris not usually grown in California. Used as one parent of the Wedgewood variety.

Iris unguicularis or *I. stylosa* (Algerian or winter-flowering iris) can stand some cold and partial shade. What appear to be the flower stems are actually long styles, and the seed pod is below the soil surface. Easy to grow. Flowers are light purple, white, or pink.

Iris variegata (Hungarian iris) is much veined with brown or a yellow ground; beard bright yellow; standards bright yellow and veined. Not grown now but one of the oldest irises in cultivation and probably the ancestor of many of the older German irises, as *Iris King*.

Iris xiphioides (English iris) is rarely grown in California because it needs much more soil moisture than the Dutch and Spanish bulbous irises. Bulbs can be ordered from Eastern and European dealers.

Iris xiphium (Spanish iris) is a bulbous iris well adapted to many California gardens; stands heavy soils very well. Should flower for several years without disturbing. The hybrid kinds, usually listed as Dutch bulbous irises, are often superior in vigor to the species. There is a wide color range, as shown in the list on page 24. These varieties may follow the early Wedgewood in season and extend flowering well into April in cool coastal districts. A reasonable amount of sun is needed to produce flowers; avoid very shady spots.

Iris Cultivars

BULBOUS IRISES (Dutch and Spanish)

Ankara — a fine bronze with wide standards and falls. Very late.

Blue Champion — enormous flower of pale blue. Stems long.

Blue Ribbon — royal blue with velvety texture and large flowers. Early. A popular introduction.

Bronze Beauty — purple-blue standards and bright orange falls.

Edward Salbach — purple with orange spot on falls.

Gold and Silver — standards white, falls deep yellow with orange signals. Tall. Midseason.

Jeanne D'Arc — cream white with small yellow spots.

Le Mogol — fine bronze of interesting color. Very late.

National Velvet — violet purple with orange blotch on each fall. Stems about 2 feet.

Orange King — deep orange standards, bright orange falls.

Princess Beatrix — largest deep golden yellow. Vigorous.

Princess Irene — a very fine white with deep orange falls. Flowers large and with good form.

Royal Purple — deep purple.

Sutters Gold — golden-yellow. One of the best.

Therese Schwartze — falls creamy white, standards soft lilac. Tall stems.

Wedgewood — a very early Tingiana hybrid. Has blue standards and falls slightly paler with yellow blotch.

White Perfection — one of the best whites. Stems long.

ONCOCYCLUS AND REGELIA IRISES AND THEIR HYBRIDS

- Allegría** — an *Oncogelia* produced by crossing *Artemis* (an *Iris korolkowi* hybrid) with a bearded iris; redder than most *Oncogelias*. Easy to grow along with summer-irrigated irises.
- Andromache** — silvery white and violet with a soft lilac veil. Signal patch claret-black. Style crests wine-red.
- Bronze Beauty** — a cross between *Iris hoogiana* and *I. stolonifera*; largest and tallest of the group. Standards golden bronze, veined lavender. Long narrow falls dark wine-red, edged bronze. Creamy beard.
- Brown and Green** — a form of *I. korolkowi*, silvery-white, shading to maroon at the base. Signal dark chocolate with green iridescence, veined in brown. Brown beard.
- Charon** — standards light buff, flushed dark crimson, veined mahogany. Falls golden buff, veined reddish mahogany.
- Late Amethyst** — a late-blooming form of *Iris hoogiana*. Clear amethyst blue, flushed amethyst at center.
- Lortetii** — large orchid-pink globular blooms to 7 inches across. Standards white with flush of lilac pink and fine lavender veins. Rare and high-priced.
- Luna** — creamy ground flushed pink and lavender and deep red-violet veins. Purplish-black plush in signal.
- Purpurea** — a royal purple form of *Iris hoogiana*, with deeper purple signal and yellow beard.

POPULAR ONCOBRED IRISES (Crosses between *Iris susiana* or *susiana* hybrids)

- Bella Mohr** — huge flowers of blackish-purple, broad, and flower sometimes flattens out.
- Blumohr** — unveined plumbago blue. Up to 3 feet tall.
- Butterfly Wings** — translucent lilac blue, veined mulberry, crimson, and russet.
- Capitola** — red violet, often used in breeding.
- Center Glow** — a creamy self oncobred with peach-apricot haft and orange beard.
- Conquest** — wisteria blue standards and cream falls with bronze beard. Signal is lavender.
- Eastermohr** — medium blue with good height and branching. Flowers large and ruffled.
- Elmohr** — reddish mulberry with large ruffled flowers of good form.
- Frances Craig** — a fine large lilac blue with very large rounded falls.
- Giant Mohr** — much darker than William Mohr and twice as tall. Color is manganese violet.
- Grace Mohr** — lavender violet with deeper shade of veining. Rounded petals.

Green Mohr — greenish-yellow with slight flush of lavender on upper part of falls.

Heather Angel — a heather-purple self of very large size. Standards broad and domed. Falls semi-flaring.

Joppa Parrot — standards light mauve, streaked mulberry. Rounded falls of bronzy gold with pattern of crimson violet streaked mulberry black. Beard golden bronze.

Kalifa Gulnare — a tall, odd amoena-variegata bicolor with pale lavender standards. Falls with crimson signal and golden buff edge, beard bronze.

Lady Mohr — standards oyster-shell white. Falls pale chartreuse veined red-violet at haft. Height up to 36 inches.

Nomohr — bamboo cream, ruffled with good substance.

Ormohr — silvery lilac and violet veinings. Tall stems.

Pink Mohr — orchid pink with mulberry signal. Bronzy-yellow beard. Not very tall.

Real Gold — golden buff with brown veins and golden bronze beard. Broad flaring falls.

William Mohr Giant — large flowers of light bluish purple striped darker. Yellow beard.

TALL BEARDED IRISES

Al Borak — wide, heavy falls. Standards copper with gold undertone. Falls russet brown. Good substance.

Arabi Pasha — deep cornflower blue with blue beard and velvety falls. Given 1953 Dykes award.

Argus Pheasant — very large, golden brown. A 1952 Dykes winner and inexpensive.

Bang — close to true red. Has good substance. Tall.

Belle Meade — pure white plicata with edges feathered violet-blue. Well branched.

Berkeley Gold — one of the older inexpensive deep yellows with good form and well branched but not widely available.

Black Hills — very dark, velvety blue-black with no haft markings. Has good form.

Black Taffeta — a popular ruffled black with black beard.

Blue Freckles — a blue plicata of interest to fanciers (see color plates, pages 18-19).

Blue Sapphire — ruffled, light silvery blue of good form and substance. Large, popular, a 1958 Dykes winner.

Blue Shimmer — a blue plicata of vigorous growth and inexpensive.

Bold Contrast — a fine variegata of good substance. Standards are bright gold and falls blackish maroon-red with orange beard.

Bronze Bell — a fine bronze that should remain popular. Patented (see color plates, pages 18-19).

- Butterscotch Kiss** — one of the newer tan irises with laced petals. Should be popular (see color plates, pages 18-19).
- Caroline Jane** — large plicata with white ground and delicate blue markings. Tall, husky, popular.
- Char-maize** — a greenish yellow with chartreuse undertone. Large blooms somewhat ruffled and with good form.
- Crispette** — lacy-edged, deep orchid pink with orange-red beard and good form.
- Dolly Varden** — a large flamingo pink with flaring petals, pink overlain salmon, good form.
- Fire Brigade** — glowing crimson-red of good size and vigorous. One of the best reds.
- First Violet** — a ruffled violet of good form and large size. Dykes award 1956.
- Flirtation** — one of the deepest pinks with red beard and large flowers, ruffled and laced.
- Frieda Mohr** — an old introduction in orchid pink that has remained popular. Not resistant to cold.
- Frost and Flame** — one of the fine new whites with tangerine beard that promises to be popular. Well branched.
- Galilee** — one of the popular new blues with fine form.
- Golden Hawk** — velvety golden flowers of large size and good substance. well placed on the stem.
- Grand Teton** — very large yellow with suggestion of chartreuse. Wide ruffled petals of good substance.
- Hallmark** — golden apricot with ruffled petals. Falls broad, tangerine beard, well branched.
- Happy Birthday** — one of the best of the deep pink flamingos. Petals ruffled, orange-red beard, good form, vigorous and free-flowering (see color plates, pages 18-19).
- Helen Collingwood** — brilliant two-toned, light lavender standards and bright violet purple falls. Vigorous.
- June Meredith** — fine deep pink flamingo with tangerine beard. Good form and good substance. A favorite.
- Lavish Lady** — ruffled sea-lavender violet with large, broad florets, well spaced on stem.
- Mary Randall** — deep rose pink self with tangerine beard and round flaring falls. 1954 Dykes winner.
- May Hall** — light flamingo pink, slightly salmon, similar to Happy Birthday but different form. Bright tangerine beard.
- Maytime** — a rose-pink amoena. Standards pale orchid pink, falls broad and deep rose.
- Melody Lane** — a fine ruffled apricot with good form and many flowers. Attractive.

- Olympic Torch** — light golden bronze of large size, tall and well-branched, fine form, ruffled, heavy substance.
- Orange Cremo** — apricot-orange, near true orange, orange beard, good substance.
- Oriental Glory** — standards mahogany red. Flaring falls are mahogany brown, gold at haft, with violet-blue blaze.
- Palomino** — an attractive flower with coppery-pink standards and ivory falls, bordered coppery amber.
- Pierre Menard** — a large medium blue self with good wave to the petals, inexpensive. One of the best.
- Pink Fulfillment** — tall flamingo pink with wide flaring falls, good substance, and large size. Considered hard to grow.
- Pinnacle** — interesting combination of white standards and primrose-yellow falls. Good form and texture, well branched.
- Queen's Lace** — cream standards and white falls, edged cream, very heavily laced.
- Riviera** — dresden yellow. Large falls with blue-white center and rounded edges, lightly laced.
- Ruffled Elegance** — ruffled, a blend of rosy violet with edges of petals darker. Well branched.
- Sable Night** — prized for its blue-black standards and velvety-black falls with bronze beard. A 1955 Dykes winner.
- Savage** — burnished red with brilliant violet blaze shooting out from beard to give a flame effect. Falls broad and flaring. Popular in its coloring. Plant may flower in fall.
- Sierra Skies** — one of the best medium blues with good form and well branched.
- Snow Flurry** — a tall bluish-white that is vigorous and flowers early. Slightly tender.
- Snow Goddess** — a very large white seedling of Snow Flurry, heavily ruffled and flaring falls, yellow beard. Well branched, vigorous. Somewhat like Swan Ballet.
- Spanish Fandango** — ruffled coppery-yellow with chestnut red. Tall flower stems and wide branching (see color plates, pages 18-19).
- Sugar Plum** — a lacy pink that is pinker than some lacy varieties. Cream pink with yellow haft and yellow beard.
- Sunset Blaze** — golden flame-salmon blend. Tall, widely branched, almost red in some light.
- Sunset Gold** — a rich gold that is sure to please, and very moderate in price (see color plates, pages 18-19).
- Swan Ballet** — a tall pure white with white beard. Fine substance, slightly ruffled. Dykes winner 1959.
- Tabu** — one of the best blue-black irises as to color.
- Tall Chief** — a fine new red, listed as Brazil red and with bright orange beard. Tall and well branched.

- Techny Chimes** — clear yellow and orange with tangerine beard. Flowers well formed and slightly ruffled. Well branched.
- Temple Bells** — large apricot yellow with orange beard. Popular.
- Thotmes III** — a popular large iris with broad golden petals and fine form.
- Truly Yours** — unusual coloring; center yellow shading to white at edges of petals. Buds yellow. Petals ruffled with lacy edge. Very late. 1953 Dykes winner.
- Violet Harmony** — fine violet self color. Casually ruffled. Dykes winner in 1957.
- Violet Hills** — fluorite violet, unveined haft, large, horizontal falls, blue-tipped beard.
- White Peacock** — a good ruffled white with bluish cast. Falls broad and ruffled. Well branched.
- Whole Cloth** — clear white standards with medium light blue falls, similar to Blue Rhythm. Well branched. Golden beard.
- Wide World** — blue standards and white falls with blue intensified near center on standards.

Note: This list of tall bearded irises is subject to change and revision as better or new irises are introduced. Some irises not listed may prove to be worthy under various local conditions. In general, the irises listed are suitable for parts of California where irises do well. No attempt has been made to appraise irises for other states where growing conditions differ from those in California. Some of the irises named are still expensive, but prices may drop enough to allow many growers to afford them.

JAPANESE IRISES

- Blue Lagoon** (Marx 1954) — clear blue, deeper than sky blue. Not ruffled. Flowers to 8 inches.
- Blue Pompon** (Marx 1955) — deep blue and ruffled with pompon center. To 8 inches diameter.
- Catherine Perry** — blue, overlaid purple with high tufts in center.
- Columbia** — blue with white veins and yellow center.
- Elbrus** — clear lavender and very large.
- Emperor's Robe** (Marx 1957) — ruffled, violet, stippled soft violet on white and veined dark violet. Flowers to 7 inches across. 32-inch stems. Midseason.
- Fascination** — mauve pink, lightly veined white.
- Frosted Pyramid** (Marx 1960) — a ruffled white of medium size with 36–40 inch stems.
- Gold Bound** — white with gold-bounded center.
- Imperial Palace** (Marx 1955) — velvety beet-red. To 10 inches across. Robust. Well-branched stems to 4 feet. Midseason.
- Imperial Velvet** (Marx 1953) — purplish red, opening red purple and later changing to a lighter tone. To 7 inches across. Stems to 40 inches. Midseason.
- Jeweled Kimono** (Marx 1960) — a good blue with broad petals, 8–9 inches across. Stems to 4 feet. Late.
- King's Court** — Beet red with some white veining and white styles tipped red. Stems 4½–5 feet. Late.

- Koko-No-Iri** — royal purple with yellow center radiating into white lines.
- Lady-in-Waiting** (Marx 1957) — Ruffled white with delicate pink border and petals edged lavender pink. To 7 inches across. Stems 32 inches. Midseason to late.
- Mahogany** — mahogany red and large. Late
- Mahogany Giant** — larger than Mahogany and a deeper shade of velvety maroon.
- Orchid Fawn** (Marx 1954) — orchid, shaded fawn brown; medium size. Stems 3–4 feet.
- Persian Rug** — large purple, edged white and with golden signals. To 10 inches across. Stems 4½–5 feet.
- Pin Stripe** — white, penciled bright blue, with tufted center. Petaloids brushed blue violet. Stems to 4 feet.
- Purple and Gold** — violet-purple with white petaloids tipped violet. Throat golden with bluish white rays.
- Silver Waves** — very large white to 11 inches across. Slender stems to 4½ feet.
- Summer Storm** — dark velvety purple, ruffled and with dark ruffled center. Orange signals. To 8 inches across. Stems 3½ to 4 feet. Late.
- Tinted Cloud** — wisteria violet with golden-yellow signals and blue border. Styles deep violet. Crumpled petal edges. To 5 feet. Late.
- Veiled Vanity** — white, veined blue, white tufted center, sanded bluish purple. Ruffled. To 5 feet. Late.
- Velvet Canopy** — a very large double red of formal type. To 11 inches across. Stems to 5½ feet. Midseason.
- World's Delight** (Marx 1953) — light orchid pink, to 7 inches across. Stems to 40 inches. Early to midseason.

Note: Experience with the Japanese irises in California is somewhat limited. Occasionally they are grown successfully in cool coastal areas from central California northward where conditions are not greatly different than in parts of Oregon and Washington. The soils but not always, may be slightly acid.

The Japanese iris has been observed growing very well near the ocean of Santa Cruz County where the soil was about neutral and contains some lime. Usually lime should not be added to the soil where Japanese irises are to be grown.

SIBERIAN IRISES

- Ahalya** — pale pearly lilac-pink with spreading falls. Early.
- Caesar's Brother** — fine purple-black with good form. Stems up to 48 inches in height.
- Emperor** — violet blue of medium height. One of the older Siberians.
- Fairy Dawn** — a pink bicolor. Standards white, falls flushed rose.
- Grandis** — narrow standards are mulberry, falls white, veined dark mulberry. 48 inches.
- Helen Astor** — rosy-red. Blooms early to mid season. Stems about 30 inches tall.
- My Love** — medium blue of good form and well branched. Stems to 4 feet tall. Blooms in May and may rebloom in July.

- New Blue** — turquoise blue and very fine. Flowers large and of good substance. Popular. Stems up to 34 inches (see photo, page 11).
- Ottawa** — blue flowers with white centers. To 36 inches.
- Perry's Blue** — a dependable old variety in light blue. Slender stems up to 38 inches.
- Rowanda Redflare** — a red self with wide petals and flaring falls. Stems to 38 inches.
- Seven Season** — large flowers of deep blue toned violet and with golden signals. Has good form. Midseason.
- Sky Blue** — sky blue with a touch of brown at the throat.
- Snowcrest** — a ruffled white. Height to about 38 inches.
- Snowy Egret** — large, pure white with bright yellow at haft, ruffled petals. About 36 inches tall.
- Tropic Night** — deepest violet blue, large, and with good form.
- Tycoon** — very large, deep violet-blue.
- Zerita** — medium blue petals with contrasting rose-red styles. Tall and fairly early.

TALL BEARDLESS IRISES OF THE SPURIA GROUP

Iris spuria is similar in habit of growth to many of the Siberian irises and the flowers are also similar but may be inferior in width of falls and standards to the best Siberians. This species has been crossed with *I. monnieri* to furnish many fine hybrids but there is still room to improve the width of falls and standards and perhaps size and form.

Some of the best hybrids introduced are listed as follows:

A. J. Balfour

Azure Dawn

Blue Rocket

Blue Zephyr

Bronze Butterfly — bronze tone

Bronspur — bronze tone

Cherokee Chief — bronze tone

Dresden Blue — blue

Driftwood — bronze tone

Dutch Defiance — blue

Euphrosyne — blue-purple

Fairy Lantern — blue

Fifth Symphony (see photo page 12 and also cover)

Golden Agate — yellow

Golden Sceptre — yellow

Harpeth Hills

Indian Summer

Lark Song — yellow and white

Lord Wolsely — blue

Monteagle — blue-purple

Mrs. A. W. Rait

Pastoral

Perky Maid

Royal Toga — blue-purple

Russet Flame — brown tone

Saugatuck

Shelford Giant

Sunny Day — yellow

Violet Veil — lavender blend

Wadi Zem Zem — yellow

White Heron — white

Zephyroso — lavender blend

Definition of Terms

USED IN THIS MANUAL

amoena — a group with white standards and blue, pink, purple, or yellow falls.

anther — the pollen-bearing part of the stamen.

apogon — lower petals or falls without a beard (beardless).

aril — a seed appendage that envelopes the seed after pollination of certain species or hybrids, as in *Oncocyclus* and *Regelia* irises.

beard — the hairy appendage on the upper surface of the falls (or standards) on bearded irises. The coarse surface growth on the crest of crested irises is not a beard.

bicolor — varieties or cultivars that have one color for the falls and another color for the standards (also see *amoena*, *neglecta*, and *variegata*).

blaze — a bursting out of color or radiating color, as on some aril irises.

blend — a blending of colors on some irises.

branching — refers to the number, length, and position of side or lateral branches on a flower stalk.

claw — the claw-like tip of the style arm.

clump — a group of iris rhizomes.

crested — a distinct crest on the falls, as on *Iris japonica*.

cultivar — a variety found only in cultivation.

diploid — with double the number of chromosomes characteristic of the somatic cells.

domed — standards curving over center of an iris flower.

endosperm — the nutritive tissue within the embryo sac in a seed.

embryo — that part of a seed which develops into a plant.

eupogon — with a beard of multicellular hairs, as in true bearded irises.

filament — stalk of an anther, a style arm.

falls — the petals or sepals that hang down on an iris flower.

flamingo — the pink or reddish color of a flamingo.

haft — the narrow, constricted part of the falls (sepals) and standards (petals).

lacy — wavy or crinkled petals.

leaf sheath (spathe valve) — a bract that subtends a flower; may be green or dry and papery.

neglecta — lavender or light violet standards and purplish falls.

novelty — applied to any flower that differs greatly from the standard, as in color combinations, form, or habit of growth.

oncobred — hybrid between *Oncocyclus* iris and another species.

oncocyclus — a group of irises with beard widely scattered on haft, as *Iris susiana*

oncoregelia — hybrid between an *Oncocyclus* and *Regelia* iris.

- ovary** — the part of the pistil that contains the ovules.
- ovule** — an immature seed.
- perianth** — the entire floral envelope, petals and falls.
- petaloid** — resembling a small petal, as in some Japanese irises.
- plicata** — light ground color laced, edged, or stippled with another color.
- pogon** — lower petals or falls with a beard, as in bearded irises.
- pollen** — the male element produced in the stamens and used to pollinate a flower.
- polyploid** — several times the number of chromosomes found in somatic cells.
- regelia** — a group of orchids with beards on both standards and falls.
- rhizome** — an underground stem.
- rootstock** — an underground stem, as in many kinds of irises.
- ruffled** — wavy or ruffled petals.
- scarious** — dry or papery, as applied to the spathe, as on *Iris pallida*.
- seed** — the ripened ovule which contains the embryo surrounded by nutritive tissues and surrounding covering.
- seed pod** — the pod that surrounds the seeds.
- self** — a single color, as solid pink or blue.
- signal** — the spot of coloring at the base of standards in aril irises.
- somatic cell** — a cell in an iris plant as contrasted with a germ cell or gamete.
- spathe** — leaflike bracts around the stem and ovary below the petals. Helps protect the flower bud.
- stalk** — the flower stem of an iris including main stem and side branches.
- stamen** — the pollen-bearing organ of a flower.
- standard** — the upright petals of an iris flower.
- stem** — see stalk. Supports the flowers on most irises.
- stigma** — the sticky band on the underside of the outer style arm where the pollen lodges.
- style** — the elongated part of the pistil between the ovary and the stigma.
- style crest** — the tip of the style arm beneath which is found the stamen.
- substance** — stiffness, resistance to touch, ability to stand adverse conditions as applied to the falls and standards of an iris flower.
- tetraploid** — four times the number of chromosomes in the somatic cells.
- triploid** — three times the number of chromosomes in the somatic cells.
- variegata** — any variety with variegated colors, especially with yellow standards and red or purple falls (see also amoena, bicolor and plicata).
- veins** — the noticeable veins or colored lines on some iris flowers, especially the aril irises, and on some Japanese iris cultivars.

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Other sources of iris information are libraries and iris societies. Your Farm Advisor can help identify serious pests or diseases and suggest control measures.

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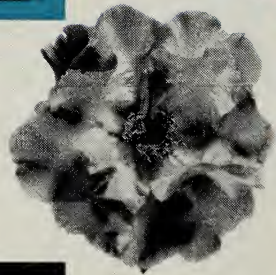
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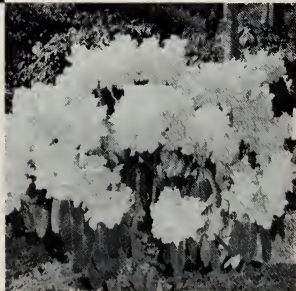
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